

which is connected an insulated wire. At or near the top of the vessel, and immersed in the solution, is placed a second copper plate or one of hard carbon, or metal unchanged by contact with zinc sulphate solution and less positive than metallic zinc; this is also connected with a wire. A current from a dynamo-electric machine is sent in the direction from the lower to the upper plate, the result being deposition of metallic zinc on the upper plate and the formation of a dense solution of copper sulphate overlying the under plate. The cell, after charging, constitutes a gravity cell, and continues a source of electrical current till re-conversion of all the copper sulphate into zinc sulphate, with deposition of copper on the lower plate and removal of zinc from the upper. The cells, in charging, may be arranged in multiple arc or in series, and differently from that in discharging, according to the object. The authors believe it possible to store and recover 50 per cent. or more of the 50 or 60 per cent. which good dynamo-electric machines realise in external work of the power used in driving them. Thus 25 per cent. of the original power may be given out secondarily as electric current. Assuming that in the best steam engines 20 per cent. of the heat energy of the coal may be utilised, then about 5 per cent. of the heat energy, it is thought, may be recovered after storage as current; but even with this small percentage the economy would be much superior to the use of zinc and other materials in the ordinary battery in production of current.

In a recent paper to the Vienna Academy, by Prof. Exner, on the theory of instant galvanic elements, proof is offered that there is no so-called galvanic polarisation in elements, but that the phenomena referred thereto are attributable to the oxygen dissolved in water. The electromotive force of an element with only one liquid appears accordingly as a constant which is in no way affected by any polarisation of the negative pole. It is further shown that the force of a Smee element is not altered when its platinum is replaced by some other metal, provided only this does not itself give rise to chemical processes.

### GEOGRAPHICAL NOTES

DR. EMIL HOLUB will read a paper before the Royal Geographical Society next Monday evening on his journey from the Diamond Fields through South Central Africa to the upper waters of the Zambesi. Dr. Holub, we understand, has for some time been exhibiting at Prague a small museum of zoological and ethnographical curiosities collected during his various journeys in Southern Africa, which has attracted much attention, and he is coming to England to attend this meeting at the special invitation of the Council of the Geographical Society.

*The Colonies and India* reports the return of Mr. Alexander Mitchinson after some years spent in Africa. He appears to have arrived on the Gambia in 1876, and to have journeyed with a small number of followers into various parts of Africa. Following the course of the Niger, he visited the waterfalls, and returning to the west coast, made excursions into the country in various directions. After a brief rest his travels were again resumed, and from the Gaboon country Mr. Mitchinson made his way into Angola, and from Benguela proceeded *via* Bihe to Lake Ngami, returning to the coast at Walvisch Bay at the end of 1879. The notes which he made in the course of his travels, are said to contain much interesting matter.

In the current number of the *Tour du Monde* M. Desire Charnay, the well-known archaeological explorer of Southern Mexico, Yucatan, and Madagascar, has commenced an account of what he saw during the six months he recently spent in Australia. His observations on the aborigines, their legends, customs, and traditions will no doubt be interesting, and his story will certainly be well illustrated. M. Charnay, who returned to Europe not long since, had, previously to his visit to Australia, spent some time in the East Indian Archipelago.

DR. BENJAMIN BRADSHAW, who was met by Major Serpa Pinto, during his famous journey near the Zambesi, and who was also with the late Mr. Frank Oates when he died near the Tati settlement on his way from the Victoria Falls, arrived in Capetown a short time ago, presumably to make another trial of the ways of civilisation. Dr. Bradshaw has spent a long time in the Matabele country and other parts of the Zambesi basin, living the life of the natives and making zoological collections for his own amusement and benefit. During his wanderings he has acquired a considerable amount of information respecting the less-known parts of the Zambesi and some of its tributaries,

which, we have reason to hope, may be made public before long.

A CORRESPONDENT in the *Glasgow Herald* advocates the formation of a geographical society in that great commercial centre, the second most populous city in the kingdom. We have on several occasions pointed out the advantages of the formation of such societies in our chief ports, by means of which much useful information might be tapped that otherwise would not see the light. No better field could be found for such a society than Glasgow.

PROF. NORDENSKJÖLD and his staff evidently do not consider that their work was finished when they got outside Behring's Strait in the *Vega*. During the brief stay of the ship at Galle they made excursions into the island to examine its mineralogy and natural history. Great preparations have been made for the reception of the *Vega* at Naples. The King of Sweden desires that the professor and the captain should visit Rome, Brussels, Paris, and London, and join the vessel again at Copenhagen, to be ultimately received at Stockholm.

DR. OTTO FINSCH left Honolulu on July 30 last, on board the barque *Hawaii*, and arrived at Dshaloot, on the island of Bonham (the principal island of the Marshall group) on August 21. He intended to investigate this island thoroughly, as it appears that this has never before been done in a scientific manner. From Bonham Dr. Finsch will proceed to the islands of the Radak group.

News from Dr. Stecker, the well-known companion of Dr. Gerhard Rolhfs, stated that he was going to leave Benghazi at the beginning of the present month, in order to proceed to Bornu by way of Fezan.

A FRENCH Company intends to cut a canal through the Isthmus of Corinth. Steps have already been taken to obtain the permission of the Greek Government.

THE German residents of Sydney have founded a branch of the Berlin Central Union for Commercial Geography.

MR. IM THURN, of the Georgetown Museum, whose labours in British Guiana have been referred to in NATURE, arrived in England last week.

### THE SIXTH CONGRESS OF RUSSIAN NATURALISTS

THE Sixth Congress of Russian naturalists began at St. Petersburg on January 1, by a public meeting in the great hall of the University. The number of members present was very large—1,200—of whom 500 were from the provinces, and thirty-eight were ladies. Prof. Kessler was unanimously elected President, but the bad state of his health not allowing him to fulfil this function, he was made honorary president, Prof. Beketoff being elected as the active one.

At the first public meeting, Prof. Wagner gave an interesting address on the "Means of Solution of the complicated Problems of Natural Science," and after a brilliant sketch of the methods of science, he drew the attention of naturalists to the necessity of the study of physiological chemistry, and especially of the problems connected with albuminous matters.

Two proposals were then discussed:—On the scientific exploration of Bulgaria, and on the necessity of making complete botanical collections of Russian plants.

The second public meeting of the Congress, held on January 7, was opened by an address by Prof. Timiriazeff, on the physiological significance of chlorophyll in the life of plants, on the absorption by it of solar rays, and on the limits of the productivity of the soil. After this the president proposed that the several projects of scientific inquiries approved by the Congress be transmitted to a special committee, which would remain as a permanent institution after the Congress, and see to the carrying out of these projects; the proposal was unanimously accepted by the Congress, and will be accomplished, if the Ministry of Public Instruction does not oppose, as it has done hitherto, the creation of a permanent scientific association of all Russian naturalists. Prof. Mendeleef proposed the publication of a popular description of Russian colonies, being a sketch of their climate, soil, flora, fauna, and economical conditions; the proposal was approved. Prof. Dobroslavine gave an address on the relations between natural sciences and hygiene. The latter has only one point in common with medicine—general pathology—whilst any progress in the department would be impossible if it were not for

the collective work of those who labour in the wide field of natural science, all most important advances in hygiene, being made by the researches of eminent specialists in natural science. Finally, Prof. Mendeleeff made the proposal to publish a new scientific periodical.

At the last public meeting of the Congress, Professors Sokhotsky and Kovalsky made a proposal to found a Russian Astronomical Society, and Prof. Tchebysheff proposed to solicit from the Government pecuniary help to the Moscow Mathematical Society; both proposals were agreed to. M. Severtsoff gave a very interesting lecture on the orographical structure of Central Asia and on its influence upon the geographical distribution of animals. Prof. Andreieff developed the idea as to the necessity of giving instruction in natural sciences in primary schools, and M. Gerd gave an address on the impulse which could be given to the study of nature in Russia, its flora, and fauna, by the teachers of the primary schools; he demonstrated by numerous facts that this help would be very effective, as a great number of teachers would be very glad to work on that field; therefore, he proposed to draw up good programmes for these studies, as well as simple manuals of the necessary elements of science. Both proposals were met with the warmest cheers of the numerous auditory, but we fear that they will meet, as have former proposals of that kind, with strong opposition from the actual Ministry of Public Instruction. After an address by Prof. Wagner, on the sociability of animals, the Congress closed its sittings; the next Congress to be held at Odessa.

In the Section of Astronomy and Mathematics we notice the following communications:—By Prof. Davidoff, on a new method for the exploration of functions, which method enables us to deduce various theorems from one general principle; by M. Preobrajensky, on the integration of Laplace's equation by means of quaternions, the communication having given rise to very animated discussion; and by M. Tchebysheff, on parallelograms, being a brilliant exposition of their importance in mechanics, together with a discussion of several points of theoretical importance. An interesting memoir was read by Prof. Bougaeff, on subtraction in the theory of numbers, which deals with several important philosophical points of mathematical investigation. Other communications were by MM. Markoff, Joukovsky, and Vasilieff, on Bernoulli's equation.

In the Section of Physics and Meteorology we notice the following communications:—By M. Ziloff, on the magnetisation of liquids; by M. Collin, on the luminous properties of electrodes; by Prof. Oettinger, on electricity; by M. Pantionkhoff, on the meteorology of Bulgaria as compared with South-Western Russia; by Dr. Woeikof, on the various causes of perturbations in the diurnal changes of temperature; and by Baron Wrangel, on changes of level in the Black Sea. This level has continuous fluctuations; it is always lower during the night, and reaches its maximum at mid-day in all sea-ports of the northern and the eastern coast; it is also at a minimum in October and a maximum in May, the difference between these two levels being 18 inches. The following communications of general interest were also made in the Section of Physics:—Dr. Woeikof exhibited a new map, showing the distribution of rainfall in all parts of the world; M. Borgmann made a communication on the influence of the inductive currents on the development of temperature during magnetisation; Prof. Lemström (Helsingfors) expounded his theory of terrestrial magnetism; Prof. Tchebysheff read a memoir on centrifugal regulators, and exhibited two of his invention; and M. Tchikoleff, on electric lighting.

In the Section of Geology and Mineralogy we notice communications by Prof. Lentz, on the level of the Amu-Darya; by Prof. Fr. Schmidt, on recent formations on the shores of the Gulf of Finland; and by M. Armatelsky, on diluvial formations in the Government of Chernigov.

In the Sections of Botany and Zoology we notice the communications by M. Tikhomiroff on the bacteria which cause disease of the bladder, and on the artificial production of these bacteria; by Prof. Ganin, on the development of fishes; and by M. Sidoroff, on the insects destroying corn in Russia.

A most interesting communication was made to the Section of Physiology by Prof. Setchenoff, on the absorption of oxygen and nitrogen by blood. Besides, we notice communications by Prof. Goloubeff, on the vibratile epithelium; by Dr. Tsioulsky, on a new method of determining the amount of blood in animals; by M. Wedensky, on the innervation of the respiratory motions of the *Rana temporaria*; and by Prof. Tarkhanoff, on the amount of blood of man.

In the Section of Anthropology were the following communications:—By Prof. Stid (Dorpat), on the relation between the indexes of the skull and that of the head; by Dr. Lubinsky on the sight, being the result of numerous observations upon the crews of the Russian navy, which observations establish a certain connection, difficult to explain, between the power of sight and the breadth of the chest. The communication by M. Dokouchaieff, on the pre-historic man of the downs of the Oka river, deals with a subject of great interest, as he affirms that the range of downs which we see along the whole of the course of that river must afford a great amount of pre-historic remains, as is the case with the downs of Volosovo and Lvinii, both having yielded thousands of such remains. Prof. Inostrantseff discussed at length the various sub-divisions of the stone period, and M. Anoutchin gave an interesting note on the frontal suture, which seems to appear most frequently in races of a higher degree of civilisation.

An interesting feature of these Russian congresses is the existence of two special sections, those of scientific medicine and of hygiene; the latter section has assumed a great importance, thanks to the energy of several eminent hygienists, as Drs. Erisman, Dobroslavine, Vyrouboff, and others. A question being raised about the hygiene of railways, the section of hygiene had two special sittings on this subject, and a committee was appointed to draw up a programme of investigations on the dress of railway employees, the number of hours of work, the sanitary state of railway stations, and of dwellings of employees, accidents, the transport of cattle, &c. A great number of other questions, as to the disinfection of dwellings, epidemics, &c., were discussed, and we hope that the work of the section will be of great importance for this kind of investigation.

Several other important communications were made in the Physical Society, and in the St. Petersburg Society of Naturalists, which both have had their annual meetings during the Congress.

#### UNIVERSITY AND EDUCATIONAL INTELLIGENCE

OXFORD.—On February 3 the question of the Natural Science Degree will again come on for discussion in congregation. Last term, it will be remembered, the proposal to grant a special natural science degree was defeated after a close division, the principal opposition to the motion coming from the scientific members of congregation. It was thought that a separate science degree, not carrying with it the privileges of the master of Arts Degree, would be regarded as an inferior degree, and tend to lower the position of science in the University. A clause is now proposed by an influential body of residents—including Prof. Odling, Dr. Mark Pattison, Rector of Lincoln, A. Vernon Harcourt, Prof. Green, Prof. Lawson, and Prof. Nettleship—to the following effect:—"Every person who shall have been admitted to the degree of Master of Natural Science, shall also be admitted to the degree of Master of Arts."

At the University Museum Prof. Clifton will continue his course on Static Electricity and Magnetism; Dr. Odling will continue his lectures on Organic Chemistry on Mondays and Fridays at noon, instead of on Mondays and Thursdays as heretofore. The examination for the Radcliffe Travelling Fellowship will begin in the Museum on Tuesday, February 10, at 10 A.M. Candidates are requested to send in their names to Dr. Acland, at the Museum, on or before February 1.

At Christ Church Mr. Vernon Harcourt will form a class and lecture on Quantitative Analysis; Mr. Baynes will lecture on Thermodynamics and Electrodynamics.

M. ROUGET, Professor of Physiology in the Faculty of Medicine at Montpellier, is nominated Professor of General Physiology in the Museum of Natural History of Paris, in succession to the late Claude Bernard.

#### SCIENTIFIC SERIALS

*Annalen der Physik und Chemie*, No. 12, 1879.—Analogies between fluidity and galvanic conductivity, by O. Grottrian.—On the magnetisation of iron rings, by A. v. Ettingshausen.—The ball-shaped electro-dynamometer, by J. Frohlich.—On gradual passage of the band-spectrum of nitrogen into a line-spectrum, by A. Wüllner.—On Stokes's law, by S. Lamansky.—On a bi-constant dispersion formula, by E. Lommel.—On the dichroitic fluorescence of magnesium-platinum-cyanide; experimental proof of